D. FOLSOM

The Potato News Bulletin

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The Potato Association of America

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Disease Control and seed Improvement Number

ROGUING SECOND CROP SEED POTATOES IN SOUTHERN NEW JERSEY

Roguing out diseased plants in a field of Irish Cobblers on the farm of Andrew Schnetzler, Elmer, N. J. The plants including the tubers that are rogued out are put into the sacks immediately to prevent insects that may be on the rogued out plants from going to the healthy ones and infecting the latter with virus diseases.

Potatoes grown for seed in southern New Jersey are planted from July 25 to August 10 so that the tubers will develop during the cool weather and will be immature when killed by frost. The state of New Jersey will not certify Irish Cobblers planted before the 25th of July.

John Shutt teaches his dad a lesson in spud growin' —

Mr. Shutt thought he knew a lot about growing potatoes, but his son John taught him a profitable lesson. This is how he did it:

On the Shutt farm in Garrett, Indiana, father and son each raised a crop of potatoes on adjoining plots of land. John used certified seed and plenty of high analysis complete fertilizer, while his dad used common seed and no fertilizer.

When the crops were dug, Mr. Shutt could hardly believe his eyes. His son dug 227.6 bushels to the acre at a cost of 36 cents per bushel, while Mr. Shutt himself obtained only 75 bushels per acre at the high cost of $1.13 per bushel. Thus, John proved to his dad that good seed plus complete fertilizer results in **higher yields at lower cost per bushel.**

New England farmers will be interested in the experiment made by G. A. Proctor of Middlesex County, Mass. This grower raised potatoes on a gravelly loam fertilized with 1,000 pounds per acre of a 3-8-10 mixture. Crop results showed that when the 10 per cent potash was left out of the fertilizer mixture, the yield was 48.8 bushels less. In other words, **the addition of 10 per cent potash** from sulfate increased the yield 48.8 bushels per acre.

The results of many experiments show that 80 to 100 pounds per acre of actual potash applied with nitrogen and phosphoric acid give profitable returns. Use the right amount and the right kind of potash in your potato fertilizer this season. POTASH PAYS!

FREE: Our new booklet, "Better Potatoes", contains a lot of helpful information on potato growing. It is being sent to potato growers free of charge. Write for your copy now.

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THE POTATO NEWS BULLETIN

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DISEASE CONTROL AND SEED IMPROVEMENT NUMBERS

After reading this excellent number kindly pass the credit on to those who have participated. Members of the committee who were requested to assist in getting out the July and August numbers deserve much praise and this is especially true in the case of Prof. R. W. Goss who sent out several letters urging others to write for these numbers.

The committee on these special numbers dealing with "Disease Control and Seed Improvement" are:—

R. W. Goss, Chairman, Agrl. College, Lincoln, Nebraska.
Chas. Hungerford, College of Agriculture, Moscow, Idaho.
Fred Krantz, University Farm, St. Paul, Minnesota.
H. C. Moore, Agricultural College, E. Lansing, Michigan.
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John Tucker, Agricultural College, Guelph, Ontario.
F. Weiss, U. S. Dept. of Agriculture, Washington, D. C.
G. L. Zundel, Agricultural College, Pullman, Washington.

THE SEPTEMBER NUMBER will be devoted to Physiological and Storage Problems. Dr. C. O. Appleman of Maryland Univer-

sity has started the ball rolling for this special number by sending an excellent article. This is the first article received for the September number. It is hoped that many others will be forth coming within the next three weeks.

Members of the committee on the September number are:—

J. T. Rosa, Jr., Chairman, Univ. Farm, Davis, California.
Wm. Stuart, U. S. Dept. of Agriculture, Washington, D. C.
L. M. Marble, Canton, Pennsylvania.
Paul M. Williams, U. S. Dept. of Agr., Washington, D. C.
E. P. Miller, 192 N. Clark Street, Chicago, Illinois.
John Bushnell, Ohio Agr. Experiment Station, Wooster, O.
Julian Dimock, East Corinth, Vermont.

Marketing and Transportation Number will appear in October. These subjects at present are receiving much attention and the October number under guidance of the following men will be an exceptionally good one.

E. A. Stokdyk, Chairman, Agrl. College, Manhattan, Kan.
W. B. Duryee, Department of Agriculture, Trenton, N. J.
Daniel Dean, Nichols, New York.
H. W. Samson, U. S. Dept. of Agr. Washington, D. C.
J. W. Weston, Michigan Agr. College, E. Lansing, Mich.
Wilfrid Boutler, Dept. of Agr., Chorlottetown, Prince Edward Island, Canada.
G. W. Waller, Hastings, Florida.
H. G. Zuckerman, 216 Drumm St., San Francisco, Cal.
W. H. Olin, 237 Equitable Building, Denver, Colorado.

MICHIGAN LEADS IN MEMBERSHIP

During the last month Prof. H. C. Moore, Chief of seed potato inspection and certification service in Michigan has sent in another list comprising 47 members of the Michigan Potato Producers Association. To date Prof. Moore is credited with securing 163 new associate members for the Potato Association of America. This number does not include all the new members from the state of Michigan. Prof. J. W. Weston has also sent in a large number and several have been received from other sources in Michigan. The results obtained by the leading Michigan potato growers reading The Potato News Bulletin monthly will be immeasurable. They will not only educate themselves in the production, storage and direct application of the information given in The Potato mation either directly or indirectly to their neighbors.

Under the present plan of running special numbers containing timely subjects more interest will be taken in reading the articles and marketing of potatoes but will naturally pass on the infor- News Bulletin may be made by the readers on their own farms.

Is there any better method of teaching? The potato growers who read The Potato News Bulletin articles written by the leading potato specialists have an opportunity to become well informed concerning the potato industry and to keep informed.

WHAT SOME OF OUR READERS THINK OF THE POTATO NEWS BULLETIN

F. M. Harrington, Horticulturist, University of Montana, writes: "We are following Nebraska's example by **signing up each potato certified seed grower** to an associate membership in the Potato Association of America and subscription to The Potato News Bulletin."

"I sincerely believe that The Potato News Bulletin is a mighty good publication and ought to be in the **hands of every seed grower** at least. It contains information that they ought to know."

"The July number of The Potato News Bulletin is an **excellent one.**"—S. G. Peppin, District Inspector, Charlottetown, P. E. I.

"I have just received the July issue of The Potato News Bulletin and I must congratulate you on the very fine publication. **I consider the articles such as the one entitled, 'A Real Problem', very valuable. This particular article contains some very practical information.** We are faced with the same problems in this province as Mr. Newdick has referred to."—C. Tice, Chief Agronomist, Dept. of Agr., British Columbia.

"The Potato News Bulletin is well worth the money and I am deeply interested in the work and very much pleased with your progress. I think **everyone that is interested in potato business should be a member of this organization.**"—G. W. Waller, Hastings, Fla.

"The Potato News Bulletin gets better with each issue and I know it will be very helpful to every potato raiser."—Lou D. Sweet, Denver, Colo.

"The July number of The Potato News Bulletin is very timely." —J. W. Weston, E. Lansing, Michigan.

"I have enjoyed receiving The Potato News Bulletin. You are to be congratulated upon the material and information which you have been putting out in this publication."—J. T. Quinn, Univ. of Missouri, Columbia, Mo.

NOW IS THE TIME TO MAKE A BIG MEMBERSHIP DRIVE

POTATO IMPROVEMENT BY SELECTION IN SELF-FERTILIZED LINES*

F. A. Krantz
Minnesota Agricultural Experiment Station

Selection in self-fertilized lines has been generally adopted by plant breeders as a method of improvement in normally cross-pollinated crops. Since the classical work of Dr. E. M. East on corn at the Connecticut Experiment Station which is being continued at the same station by Dr. D. F. Jones, and substantiated by investigators at other stations, this method has secured general adoption for improvement in corn, and is being utilized for the improvement of other normally cross-pollinated crops.

Briefly, the method consists of selecting the most desirable individuals of each generation in self-fertilized lines and their use as parents for the succeeding generation. Undesirable characters and deleterious growth factors are by this method eliminated from the heritage of resultant individuals. The final step in the method is the recombining of the selected individuals. An outstanding feature of the method is the hybrid vigor displayed by the progeny of crosses between certain individuals. In vegetatively propagated crops this method would appear to be particularly appropriate as by vegetative propagation the hybrid vigor would be maintained indefinitely.

Work was commenced at the Minnesota Experiment Station in 1921 to determine the practicability of applying this method to the improvement of the potato. Besides studying the mode of inheritance for numerous characters, certain studies have been made during the progress of the work which give some idea of the value of the method as a practical means of potato improvement. These studies consisted of a determination of, (1) the effect to which self-fertilization is possible in the potato, (2) the extent of self-fertilization on vigor, (3) the degree of hybrid vigor which might be expected from crossing inbred lines. Continued self-fertilization has been found possible and lines have been secured from numerous varieties which have been self-fertilized for from one to four generations, and there is reason to believe that self-fertilization can be continued until the lines breed true from seed. A fourth generation line is breeding true at the present time for its important commercial characters.

The vigor of lines in general have been reduced by self-fertilizations, though not to a degree which would prevent them from being perpetuated. However, a greater proportion of seedlings have died in the inbred lines the first year before producing tubers. In order to determine the occurrence of heterosis or hybrid vigor in potatoes, varietal crosses were at first made. The progeny of such

* Published with the approval of the Director as Paper No. 550 of the Journal Series of the Minnesota Agricultural Experiment Station.

crosses were usually distinctly more vigorous than the progeny of either parent when self-fertilized. Crosses between inbred lines are being made at the present time for a study of hybrid vigor. Two crosses between first and second generation lines were made last year. At the present time the progeny of these crosses exhibit from three to four times more vine growth than seedlings of the self-fertilized lines, and are conspicuously outstanding in the breeding plot.

The results of these preliminary studies strongly suggest that it will be a relatively simple matter to **obtain by this method varieties that will be superior to our present commercial varieties.** The primary requisite appears to be a careful analysis and selection of the breeding material before making the final cross.

TUBER-UNIT SEED PLOTS IN MAINE IN 1925

Donald Folsom

This year there are over 100 tuber-unit seed-plots planted under the direction of the County Agents of three counties in central, southeastern, and northeastern Maine. These seed-plots were patterned more or less after methods developed by the Maine Agricultural Experiment Station at Aroostook Farm. A fundamental purpose of this kind of work is to produce native foundation stock, imported stock being costly and somewhat uncertain as to certifiability here, while certified seed is still more likely to be uncertifiable the next season.

Tuber-unit seed-plots are like other seed-plots in regard to the use of volunteer-free land isolated from other fields, but are different in having the seed-pieces of each tuber grouped. Instead of cutting the seed in the cellar and mixing it all together before planting, each tuber is cut separately in the field and its parts are planted in consecutive hills. Planting is done by hand, dropping the seed-pieces into an open furrow or inserting them into the soil with a hand-planting machine, or even is done sometimes with a field planter of the Robbins type.

The grouping of the seed-pieces that are cut from each tuber has several advantages. **It makes it easier to detect degeneration diseases and so increases both accuracy and speed in roguing out such diseases.** One of these diseases, such as mosaic, leafroll, or spindle-tuber, when present in a tuber, usually is in all parts of the tuber. Diseased hills when grouped in a tuber-unit are more certain to be seen than the same hills scattered. Scattered diseased hills are often passed by unrogued because of the occasional seasonal obscuring of disease, because of some plants growing more slowly and not showing disease as early as the others, and because of some diseases being difficult of detection under the best of conditions. When gaps are left in the row between the tuber units, the limits of each unit can be readily seen and the

entire unit rogued even when only part of the hills of the unit have grown large enough to show disease.

Sometimes the increase in these diseases is greater than the amount originally present. The earlier and more complete roguing that is possible with tuber-unit planting reduces the amount of spread of disease by removing the sources of infection earlier and more completely. This method of planting reduces the amount of spread of disease also by reducing the amount of contact between diseased and healthy hills, through planting diseased hills together.

Tuber-unit seed-plots seem to fit in better where potato acreage is limited, as isolation is easier and the growers are more accustomed to hand work. **They reduce the time needed in mid-season for roguing, compensating for the increase in the time needed for planting. Supplementing the roguing for disease, tuber-line strains can be selected, compared, and maintained, improving vigor and type** at least as well as hill selection together with the usual method of conglomerate planting.

THE FUTURE PROBLEM OF POTATO SPRAYING

Daniel Dean, Riverdale Farms, Nichols, N. Y.

The most serious problem of certified seed potato production is that of the control of virus diseases. These are to a great extent spread from plants through the agency of various species of insects. When it may become possible to perfectly control these insects by some form of spraying or dusting, the problem of the virus diseases will be largely solved.

The first problem of potato spraying, including the use of materials in the form of dust, was that of the use of poisons, usually arsenicals for the control of chewing insects, of which the Colorado potato beetle is the familiar example. A very poor grade of work in spraying was sufficient in this period.

The second period was that of the use of bordeaux mixture for the control of late blight and rot and of early blight. Disappointment was a common experience for the potato grower twenty years or more ago, when the small capacity, low pressure machines of that day with their poorly arranged nozzle equipment were used. Gradually stronger and better machines were designed and the blights were better controlled. In recent years, with pressures of 200 to 300 pounds, and with the best recent nozzle equipment growers are finding better success in the control of a number of other insect pests. With the leaf-hopper and the flea-beetles growers can now get a degree of control formerly impossible.

We have now come to the beginning of a third period in potato spraying, that for the control of insects proved or suspected to be the carriers of dangerous virus diseases such as mosaic, leaf-roll, etc. This problem is a very difficult one. To hold the transmission

of the virus diseases to a low tolerance limit means that the insect must be controlled to a very high degree of perfection. With only a few insects needed to carry disease to a percentage fatal to seed certification, the grower is in a far harder position than with a chewing insect like the Colorado potato beetle. With the latter a light infestation means only a small loss of leaf surface to the plant, a loss which under certain conditions might even possibly be beneficial as a pruning operation. For the producer of certified seed potatoes and his scientific guides the ultimate standard of perfection in spraying is that of practically perfect control of every insect which might carry a virus disease from plant to plant.

Will this standard ever be reached? No doubt it is at present beyond our limits of spraying efficiency. It is now only an ideal towards which to work. In the meantime, every increase in the standard of spraying or dusting efficiency means better control of our old enemies, such as the late and early blights, and insect pests now fairly well controlled. We may never reach perfection in spraying, but every advancement means a better product of certified seed.

SOME PHASES OF POTATO DISEASE CONTROL IN MICHIGAN

H. C. Moore

A marked improvement has been noted in the past few years in the general condition of Michigan potato fields. This general betterment is largely due to the more common use of certified seed, which practically solves the disease problem as far as such troubles as leaf roll, mosaic and other virus diseases are concerned.

Five years ago or so it was rather the usual thing to find fields that were practically free from leaf roll, mosaic or spindle tuber. High percentage of one or more of these diseases could be found in most fields. The sixty to seventy thousand bushels of certified seed that have been planted annually by Michigan growers for the last few years have clearly demonstrated the value of good seed and show the need for its general use. There are still too many growers planting common seed and producing inferior crops of table stock potatoes. Through certified seed demonstrations and an **aggressive better seed campaign** it is expected that the quantity of certified seed planted in Michigan next season will be greatly increased.

In the efforts that have been made in the past year for increasing the planting of certified seed, special mention should be made of the results that have been accomplished through Boys and Girls Potato Clubs. There are about seventy of these clubs in the state with a membership of approximately 600. Certified seed

has been given to these club members by the certified seed growers and this seed has been pitted against the ordinary seed produced on the club members farms. In most every case the results secured have convinced the "old folks" that it pays to use certified seed. Aside from the seed donated by growers, considerable incentive has been given to club demonstrations by various commercial organizations that have bought seed and given it to the boys and girls with the agreement that it be grown under the direction of the Potato Specialists and Club Leaders. Last year the Kiwanis Club of Pontiac gave 100 bushels of certified Rural seed to 100 club boys and girls of Oakland County. The results secured were very gratifying and have helped to popularize the planting of certified seed in a county that produces a million or more bushels of potatoes annually.

To increase the use of certified seed, high standards in the inspection and certification work must be maintained so that the output is of uniformly high quality. The results from one car load of poor seed will offset those from several cars of good seed. To reduce the cars of poor seed to the lowest possible minimum rigid inspection requirements must be enforced, and the growers must be imbued with an earnest desire to produce and market the best seed possible. **Whole hearted cooperation between the grower and the inspection authorities is essential, and those growers who are not conscientious in following the prescribed regulations for seed production had better get into some other line of work.** The desire on the part of most Michigan growers to follow out the certified seed regulations has made it possible to materially raise the standards for certification and increase the average yield per acre. In 1920 the per cent total of combined diseases allowed at the second inspection was ten and the average yield per acre from certified fields was 138 bushels. In 1924 only two per cent of all diseases was allowed at time of second inspection and the average yield per acre was 215 bushels.

Of the various requirements in certified seed production in Michigan it is believed that the seed plot method of hill selection has been one of the most effective in producing high quality seed. All certified seed growers are required to maintain seed plots which must be **rogued at least five times during the season and sprayed thoroughly** for the control of insects and foliage diseases. **The seed plots must be well isolated** from other potato fields and at harvest time, all hills of poor yields or poor quality seed are discarded. The best quality seed thus saved is used to plant the acreage listed for inspection the following year. The area of the seed plot is generally about one-eighth that of the acreage under inspection. During the field inspections special attention is given to the seed plot.

Certified seed production has given considerable impetus to the more general use of up-to-date cultural methods in growing pota-

toes. This is particularly true in the case of spraying. In some of the leading certified seed counties the number of high pressure sprayers now in use is from ten to fifteen times that of five years ago.

Hopper burn caused by the potato leaf hopper is the most serious foliage trouble in Michigan; in some seasons causing a loss of twenty-five to fifty per cent. Early blight is present every season and does considerable damage to unsprayed fields. Late blight is usually present in restricted areas each season, but has occurred in epidemic form only eight times in the past forty years.

Home made Bordeaux mixture of 4-4-50 strength is the most effective spray material for early and late blight as well as for the control of leaf hoppers. **Fields under inspection must be sprayed at least five times duing the growing season with Bordeaux mixture.**

Dusting potatoes for the control of insects and blight is not generally practiced in Michigan.

The following table gives the results of an experiment conducted in 1922 at the Chatham Experiment Station in which dusting and spraying were compared. *

RESULTS OF SPRAYING AND DUSTING POTATOES IN 1922

Treatment	Av. yield per acre mkt. tubers	Est. gain from treat. in bu.	Est. gain at 50c per bu.	Est. cost of treat. for labor and material	Net gain	Net loss
Untreated plots	153.2					
Bor. Mixture 6 applications	229.7	74.1	37.05	14.93	22.12	
Bor. Mixture plus Nicotine 3 applications	190.7	34.8	17.40	11.96	5.44	
Copper Sulphate lime dust, 6 applications	184.0	27.4	13.70	31.32		17.62
Copper Sulphate-lime nicotine dust, 3 applications	141.5	12.5	loss 6.25	32.16		38.41

Variety—Green Mountain.
Season very good for test. Leaf-hopper injury severe.

The results of the first years test seem to the writers so decisive and so consistent with the tests of other workers on the same subject as to decide the relative value of the various treatment tests. These tests seem to show that spraying of potatoes with Bordeaux is the best practice in preventing loss from leaf hopper attack and one in which the cost of operation is small enough to permit its use. *

* J. E. Kotila and G. H. Coons.—"Spraying and Dusting Potatoes in Michigan."

METHOD OF INSPECTION

J. Tucker, Ontario, Canada

I believe a discussion on the various methods of making field inspections would be of interest to inspectors and growers alike and at the same time would perhaps be helpful to those in charge of the insepction work in the various states and provinces.

In this province at the first inspection we make a practice of first looking up the grower before we enter a field and have him come out to the field with us. From him we obtain all particulars relating to the source or sources of seed, number of years he has grown it, whether roguing has been practiced or not, condition of seed at planting time, acreage, average yields obtained, condition of soil at planting time, etc. If he is a new applicant we then point out diseased plants to him until he is able to recognize them himself; **if he is a regular seed grower we have him point them out to us to prove that he knows what plants have to be taken out,** this over, we proceed with the inspection as follows: First proceed diagonally across the field from one corner to the other, looking up and down each row as we cross them to note any variations such as off colored areas in the field, etc., and taking particular notice of any uneveness of growth, for we find in practice that where the plants run uneven there we usually find disease more prevalent. If the field is a large one we will then start back across the rows, keeping near the outside edge of the plot and proceed all around the field to locate suitable spots which, in our judgment, will give good average counts which will be representative of the field as a whole. We then take one hundred, or more often two hundred, hills in each place selected and count all the definite diseased plants in that number, making up our reports on each row as we go and marking down each diseased plant as we come to it, then total up all counts and obtain our average for each disease. We then check up with further counts as we are walking down the rows to leave the plot, and then advise the growers what we have found in the field and what he should do in the matter. If there is too much disease present to warrant him roguing for seed purposes we advise him to procure fresh seed for the following season and send him a list of Certified Seed growers later. If the disease content is low and the plants good and vigorous and typical of the variety we advise immediate roguing and arrange to visit the field again at the first opportunity (usually in about three weeks.) At second inspection we proceed direct to the field and make our counts for disease and turn in a full report on condition of field, stand, vigor, cultivation, etc., and state if we would recommend this field to be accepted for certification. The grower is advised direct from headquarters if his field has passed or not, to those who pass a card is sent which can be mailed by the grower to the District Inspector requesting tuber inspection.

COOPERATIVE POTATO SEED ORGANIZATION AFFILIATES WITH MICHIGAN CROP IMPROVEMENT ASSOCIATION

J. W. Weston

The Michigan Certified Seed Potato Growers Association has affiliated with the Michigan Crop Improvement Association. The potato group will retain their identity but by affiliating with the Michigan Crop Improvement Association it will bring the members the benefits of the older organization without paying any additional fees. The single $2.00 fee will entitle them to all the rights and benefits of both organizations.

This affiliation of the Michigan Certified Seed Potato Growers Association with the Michigan Crop Improvement Association was brought about recently when the Board of Directors of the Michigan Crop Improvement Association voted unanimously in favor of the proposal for such a union submitted by the seed potato growers. This plan was endorsed by the potato seed men at their annual meeting in Cadillac on June 12.

The proposal makes the Michigan Crop Improvement Association the certifying agency and the Michigan Certified Seed Potato Growers Association, with their connection with the Michigan Potato Growers Exchange as seed sales agent, the **official pooling agents** for the certified seed potatoes.

The inspection of potatoes will be supervised by the Farm Crops Department of the Michigan State College, Mr. H. C. Moore in charge, and the certification will be done by the Michigan Crop Improvement Association on the basis of the findings of this inspection.

Growers of seed potatoes not members of the Michigan Certified Seed Potato Growers Association may sell their seed individually so long as they adhere strictly to the rules and regulations.

LOOKING OVER NORTHEASTERN POTATO FIELDS

H. R. Talmage

The party consisted of four large potato growers from Riverhead, Long Island, N. Y. The same party has made practically the same trip for the ten previous seasons and about the same time each year; either the last of July or the first of August. The object of these trips was to locate desirable fields of potatoes from which to purchase seed later.

The recent trip started on July 19. We went to northern New York, then across northern New England to the Canadian border and thence down along the Atlantic Coast to Riverhead, a distance of 1900 miles in twelve days. Everywhere there was evidence of sufficient rainfall.

Besides potatoes, oats and hay were the predominating crops in the districts traveled. These crops looked well and should

produce good yields. Haying had been delayed by damp weather. Oats were lodged more than usual.

We took in the "Northern New York Potato Tour" on July 21 and 22. These two days were spent in looking over fields of potatoes grown for certification. The stand was generally good and the fields reasonably free from degenerative diseases. Apparently the lack of sunshine and the cool wet weather had given nearly all the potato plants a peculiar rolling to many of the leaves. This was not regarded as being at all serious and with a few days of warm sunshine the potatoes should recover from this peculiar condition and grow rapidly. Nothing was observed to prevent this section from having a full crop of high quality potatoes. Most of the seed fields had passed the first inspection and should make a fine lot of certified seed. This section produces the Green Mountain variety almost exclusively.

From northern New York we passed over into Vermont through a beautiful drive down over the islands in Lake Champlain. Two days were spent in looking over the potato fields of Vermont. The potatoes in this state were a week earlier than usual and looked good all over the state as far as we went. The individual grower here as a rule produces a small acreage. Their standard of certification is high and in the past quite a large amount of very fine seed has been produced. Indications point to high yields and never better in quality. By far the greater part of their production belongs to the Green Mountain group with a small percentage of Irish Cobblers.

From Vermont we crossed over to the central Maine district which centers in a section from Newport on the south to Dover on the north and Bangor on the east. Here the potatoes looked well, although in some of the late planted fields there were considerable misses. This missing was due principally to the fertilizer coming in contact with the seed pieces. Relatively little certified seed is grown in this section.

The Corinna Seed Potato Farms are located in this section. This year they are growing about 200 acres of potatoes and these looked very promising and were very clean of disease. On these farms, two years ago, four thousand hills were staked and dug separately and since they have been grown in such a way as to isolate the higher yielding strains.

From the central Maine district we drove to Aroostook County to the town of Houlton in the southern part of the county and a distance of 150 miles. A day and a half were spent in driving over many of the main roads and some of the back roads covering another distance of 150 miles. On the whole there were never better prospects for a big crop in that county and Aroostook is the big producing section of New England. A possible ten per cent showed some misses due to dry weather and fertilizer injury at planting time. There is always some misses and there is not much more than usual this season. The balance of the acreage

looks very fine and the growers, merchants and bankers are very optimistic for both the crop and the price.

The Irish Cobbler variety grows to a greater perfection in Aroostook county than in any other section of this country with which the writer is acquainted. A large acreage of this variety is always grown there, but this season there was a 20 per cent reduction in acreage in Irish Cobblers in comparison with last season. Both the Green Mountain and the Irish Cobbler fields had splendid foliage and were covered with blooms.

Nightingale and Son Company of Fort Fairfield had several hundred acres of Irish Cobblers which were reported to have passed 100 per cent free of degenerative diseases and we looked a long time before finding a plant that needed roguing out.

Two years ago our same party made this trip and after looking the county over agreed that mosaic, leafroll, blackleg, and spindle-tuber, (the last then not named) would reduce the crop yield from 35 to 40 per cent. Because of weather conditions disease free seed showed up much plainer than usual. The difference was so striking between certified and ordinary seed that the growers imported into the county many carloads of clean seed the next year. This gave a much better crop last season and this summer nearly the etire crop has been planted with high quality seed obtained from those growers who have planted the certified seed the past two seasons.

It is estimated that there is a small decrease in both acreage and the amount of fertilizer used per acre this season, but with the very favorable climatic conditions for the remainder of the growing season and the almost universal use of good seed there will be another large crop of potatoes in Maine this year. The crop in this state is about ten days earlier than usual.

POSSIBILITIES OF POTATO SEED PRODUCTION IN WESTERN WASHINGTON

George L. Zundel, Plant Pathologist, Extension Service, State College of Washington

Last spring at potato planting time I had numerous inquiries from various potato growers in Washington asking where they could get good seed. So far as the Netted Gem variety was concerned, we could refer them to the famous Engler strain grown in Clark County, Washington, which has less than one-half of one per cent mosaic, but I was very much chagrined to have to refer farmers who asked for early seed to the seed producers of Minnesota and Wisconsin. This is doubly unfortunate, since in the western part of Washington we have ideal conditions for the production of the highest grade seed that it is possible to produce, and it is for the purpose of drawing the attention of potato growers in the

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SPRAYS are chemical compounds. Their effectiveness depends upon scientific preparation.

Mixing your own spray is both unsatisfactory and unprofitable. It involves extensive equipment—messy preparation. Even though you have the best Lime and Copper Sulphate obtainable, you have no way of knowing their exact strength. You are not a chemist and must depend on the integrity of the seller.

Though much care is taken in mixing and straining, the element of uncertainty still exists — the strength of your spray is unknown. Grit and unslaked lime are bound to get into the tank to clog the nozzles in the field.

No Delay, No Mess, No Uncertainty with Pyrox

Pyrox is the one best spray. All ready to use — simply mix with water. Of known strength — ingredients guaranteed to be in a definite ratio. No sediment or grit to cause clogging. It gives finer mist, greater coverage and better protection.

For twenty-seven years Pyrox has been used on vegetables and small fruits. It kills bugs, prevents diseases and stimulates the foliage, — thus increasing the yield.

Don't risk the safety of your crops for the sake of a few cents per pound on your spray material cost by trying to mix your own spray. Buy Pyrox today and save time, labor and your crop. Dealers everywhere.

BOWKER CHEMICAL COMPANY

40 West Street, New York, N. Y.

United States to the big possibilities of potato seed production in western Washington, that I am preparing this article.

In order to see the possibilities one must spend a number of years in the state, and have the opportunity of getting to some of the isolated spots. You must remember that the Olympic Penninsula, which comprises the counties of Clallam, Jefferson, Kitsap, Mason, and portions of Grays Harbor, forms the last great frontier of America. The topography of this penninsula is such that there are a great number of small valleys cutting up the penninsula, some of them so small that frequently one man owns the entire valley. This makes it possible for the man to absolutely isolate his seed plot, and absolutely make it impossible for mosaic and other insect carrying virus diseases to be brought into his place.

As an example of what isolation will do I will illustrate by a recent tour held in the Dabob section, in east central Jefferson County, where I found strains of potatoes that had been in that little valley for twenty-five or thirty years. Search as we did, we could find less than one per cent mosaic. Unfortunately, the strains of potatoes that these people were raising were not suitable for marketing. This year we brought in certified Burbank seed, and found that it contained but 1½ per cent of mosaic, and due to prevailing conditions in that county, I am sure that we will have a strain of Burbank seed next year practically free from mosaic.

Again, under similar conditions in the Olalla community in Kitsap County, I found a man that had been raising a strain of Snowflake potatoes for 35 years, in an area of about one and one-half acres, and in all that area I was able to find but two mosaic plants.

Again, we have the islands of Puget Sound, some of them small enough for one man to own an entire island, and here again we have a chance for absolute isolation, since it is impossible for aphids to fly from the mainland to some of these islands.

Again, we have in central Washington, the Badger Mountain, which is in reality a very large butte, rising up from the central plain east of Wenatchee, to an altitude of approximately four thousand feet. On this mountain are numerous little ravines which formerly produced nothing but rosebush, but when this rosebush is cleaned out there is a deep black loose loam, so full of humus that a persn can put his toe into the soil at any time during the summer and find moisture within an inch or two from the top. We have plots on top of this mountain this year for the first time, and isolated so that the closest potato patch is from two to three miles away, and an intervening ridge between.

During the last four years that I have been doing work in the control of mosaic in western Washington, I have always found the man who is always importing or changing seed because a bad infestation of mosaic, and it is not uncommon to find individual farmers scattered over this vast area that have had the seed on

their places as long as 35 to 40 and 45 years, and in these places it is practically impossible to find mosaic. Unfortunately, however, practically every case in which the farmers have raised their own seed for a long period of time the potatoes are not of a commercial variety.

While we are talking about isolation, so many of our western states can give equally good examples of isolation, but I challenge any of them to produce the climate for the production of potatoes. The cool, even climate of the Puget Sound region is extremely favorable for the growing of potatoes, and especially for the detecting of mosaic. In eastern Washington, where we have our hot days, it is not uncommon to have masking of symptoms of mosaic and other diseases, but as soon as we cross the Cascade Mountains going west we immediately strike a climate in which the symptoms appear to their best advantage, and with proper care it is possible to eliminate mosaic from certain strains of potatoes.

It is a new country out here, and for that reason the potato industry has not the foothold that it will have in the future. Some day we will be producing enough seed potatoes on the west coast to supply the Yakima country, and also to supply the needs of the entire Columbia Basin, as soon as irrigation water is put on this vast area. This will be the means of saving our commercial potato growers thousands of dollars in freight which now goes to bring in seed potatoes from Minnesota and Wisconsin. In making this statement, I do not desire to cast any reflection upon the seed potatoes of those states, since we usually have very good success with that seed, but there is no need of the Washington growers spending so much money on freight rates when they can produce their seed at home.

It is certainly gratifying to note that people from outside the state have also noticed these possibilities when they have the opportunity of penetrating some of these out of the way places. Recently I had the great pleasure of having with me Mr. F. C. Meier, Extension Plant Pathologist of the United States Department of Agriculture, and the first thing that he was impressed with in going over such places as King, Snohomish, Whatcom, and parts of Jefferson County, was the possibilities of complete isolation for seed potato production.

AN ACCOUNT OF POTATO TROUBLES IN SOME PARTS OF NEW YORK STATE DURING THE PAST MONTH

M. F. Barrus

Many fields in western New York showed a poor come-up when observed during the week of July 6. In some cases there was only 75 per cent of a stand with many weak plants but in most

fields the stand was better than this. By digging into the soil at missing hills and beneath weak plants it was found that the seed piece had invariably decayed and almost nothing was left except the dry skin. There seemed to be little evidence that Rhizoctonia had played any considerable part in bringing about this condition. Inquiry revealed that, in many such fields, planting was made during the first part of June when the temperature was extremely high, being above 90° F. on several days. The soil at this time was dry but not exceedingly so in most cases. It seems probable that the temperature rather than moisture content of the soil was the factor most responsible for the poor stand, injuring the germination of the tubers and by favoring the development of certain tuber decaying organisms. Fields planted before this hot period had a much better stand and the percentage of weak plants present was not unusual. The loss from this condition in western New York could not at the time be determined. **The vacant spaces will be occupied to some extent by nearby healthy plants so that the reduction in yield will not be correspondingly large.**

A visit was made to Chenango County on July 16-17. The fields there are mostly small and the planting in nearly all cases was made in May. Some fields in the vicinity of Sherburne, planted during the first part of June, showed the same poor come-up as had been observed in western New York. Many of the earlier planted fields showed a peculiar rolling of the leaflets which might easily be mistaken for leaf-roll except that all plants in a field were thus affected. This condition made it very difficult to detect the true leaf-roll disease. The set of tubers in Chenango County appeared to be very good.

The same rolled condition of the leaves was also observed during the week of July 20 in many fields in northern New York. The rolling occurred regardless of the type of soil or the culture the plants had received. It seems very likely that the weather during the preceding weeks was largely responsible. The temperature since the 9th of June has, on many days, been somewhat below normal and there has been more rain than usual during this time.

The set of potatoes in Ulster County, visited on July 30 and 31, is very light, there being only three to four tubers in a hill although certified seed was planted and the vine growth is satisfactory. The planting in this section was made during the latter part of April and the plants were setting during the hot spell in June. This may have had some influence on the set. The vines are being injured considerably by leaf hopper but there will be ample leaf area to provide the necessary size for the few tubers formed. There is a greater danger that the tubers will grow oversized.

Late blight was observed on a few leaves at Ithaca on July 27 and there was one report of this disease the week before from Cortland County.

Conditions have been unusually favorable for the detection of mosaic on all varieties both in the sample plots and in the fields.

DISEASES OF THE TRIUMPH POTATO IN LOUISIANA

G. L. Tiebout, Horticulturist.

Mosaic, spindle-tuber and common scab are the predominating diseases of the Triumph potato in Louisiana. The planting of good cetified seed of the variety mentioned will pactically control the two former diseases, while common scab in Triumphs from certified seed can usually be held in check by the formaldehyde treatment if the initial infection is not too great and the seed stock is properly sorted for the elimination of deep scab and the run of surface scab.

Most of the potato growers of Louisiana can now detect the mosaic disease, and they are demanding certain strains from definite sections or states where certification standards meet our requirements. So far as we know, there are no strains of certified seed that are free of the mosaic disease. The specialist of the College of Agriculture is usually consulted through the county agents, and the performance of the certified stocks from the various states is carefully watched, there frequently being an opportunity in the same community to observe commercial fields from several sources of certified seed. Other things being equal, the certified stocks showing the lowest percentage of mosaic and spindle-tuber over a period of years, give the best results. As a rule, the mosaic disease gives a splendid expression of its presence during the early part of the growing period, and field counts are not difficult to make. At the North and West, however, this disease is "masked" in some seasons, hence the necessity for our planting proven strains and not depending on a short-time record or certificate.

Within the last few years we have begun to make field readings of the spindle-tuber disease and we are afraid that it will be as serious, if not a greater menace than the mosaic disease. We thought we had our seed problem pretty well solved when we learned how to pick hundreds of carloads of certified Triumph seed potatoes without a complaint from our planters on account of mosaic disease, but what is before us on account of the spindle-tuber disease remains to be seen.

As the spindle-tuber disease is supposed to be spread by plant lice, we will have to get the probable effect of the secondary infection of certified seed at the growing sections on our primary infection here, just as we have done with the mosaic disease.

The best of the certified Triumph seed has saved our Triumph potato industry.

PROTECTING CERTIFIED SEED AGAINST FRAUD

Walter M. Peacock

Protection against fraud is one of the most, if not the most vital problem confronting the certified seed industry today. Certification of seed with the idea of misrepresentation is tyranny to the industry. It is not only injurious to the growers who buy such seed; but to the producers of genuine certified seed, and to the State and Federal Governments who have spent large sums of money in promoting seed improvement projects.

Is the certification of seed worth while? Is it worth the time, energy and money being spent on its development and promotion? To answer these questions it is essential to briefly review the history of seed certification and it shall be confined strictly in its relation to potatoes.

The work of improving seed potatoes by inspection was started in 1914, Wisconsin being the first state to offer it officially to its growers. Its example was soon followed by other states in their endeavor to compete in the quality of this commodity.

The first inspection work in New York State was done in Franklin County in 1914 by Dr. M. F. Barrus and the writer and in Clinton County the same year by County Agent Tillson and the writer for the Saranac Valley Seed Potato Association. Unlike Wisconsin, this work was wholly of an unofficial nature as far as the state was concerned. In the decade following its inception, the certification of seed potatoes has made enormous growth. In 1924, inspection service was offered by 21 states in the United States and all the provinces in Canada, and 8,000,000 bushels of officially certified seed potatoes were produced in North America.

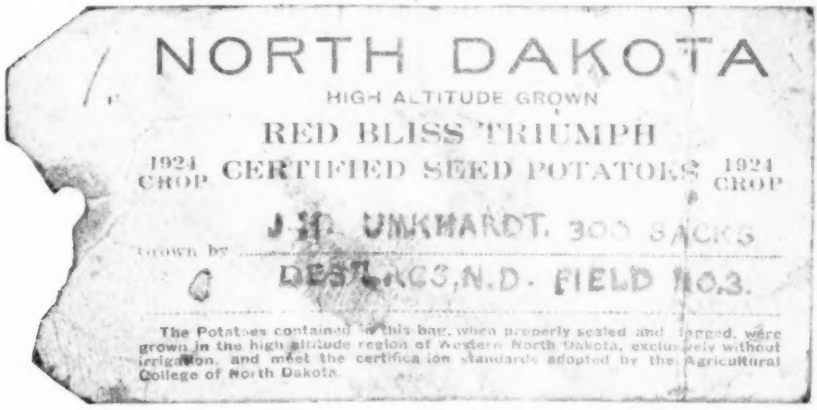
The planting of certified seed greatly increases the yield per acre, and potatoes grown from such seed usually bring a higher price per bushel, irrespective of their use for seed or table stock. The gain secured by planting certified seed can be measured in millions of dollars annually, and no one familiar with conditions will doubt the truth of these statements. Hence, it is conservative to state that the efforts and money devoted in promoting this phase of the potato industry have been well spent and many of the results are immeasurable.

What would have been the yield of potatoes in North America today if there had been no seed improvement work done? Instead of an apparent increase, the average yield per acre would in all probability show a marked decrease. Perhaps all the leading varieties would show a large percentage of virus diseases, and you know what this would mean to the potato industry.

Undoubtedly, the men who are selling potatoes with imitation certification tags attached, belong to the class who scoffed at the idea of producing certified seed potatoes a few years ago. Now they are trying to reap some of the profits of your efforts through

misrepresentation and to indirectly destroy the foundation which you have built.

Perhaps there are some who would like to have a better idea of the value of these imitation certification tags. Some of the imitation certification tags are so cleverly worded that it is difficult at the first glance to detect them as such. Here is a typical sample of a cleverly worded imitation certification tag. Study it. Does it contain a guarantee that is worth while?


NORTH DAKOTA
HIGH ALTITUDE GROWN
RED BLISS TRIUMPH
1924 CROP CERTIFIED SEED POTATOES 1924 CROP
J. H. UNKHARDT. 300 SACKS
grown by
DESTRICT, N.D. FIELD NO. 3.
The Potatoes contained in this bag, when properly sealed and tagged, were grown in the high altitude region of Western North Dakota, exclusively without irrigation, and meet the certification standards adopted by the Agricultural College of North Dakota.

The maximum peak of benefits derived from certification of seed potatoes will not be reached until the following salient factors are given the fullest consideration:—

(1) Uniformity of certification requirements throughout the country; (2) Better trained inspectors; (3) More frequent field inspections; (4) More thorough inspection of the tubers either in the field or the bin. (5) Better supervision of grading the stock before shipment. (6) Education of growers purchasing certified

seed so that they will be able to detect genuine certification tags from counterfeits; (8) Adoption of a copyrighted trade name for certified seed or legal protection of certified seed as has been done in Canada.

The certification requirements in the Dominion of Canada are the same for all of its provinces. However, this ruling does not prevent any one province or an individual grower from raising the quality of their seed above the required certification standards of the Dominion. When one buys certified seed potatoes in Canada he has the assurance that they have passed the Canadian certification requirements and that it is not necessary to examine 21 different sets of rules to learn the meaning of certification.

If the same set of certification requirements can be satisfactorily used in provinces that are as widely separated as Nova Scotia, Ontario and British Columbia, why cannot a similar set of certification requirements be put into practice in the state of Maine, Wisconsin, Washington and other states producing certified seed potatoes? This question surely furnishes food for thought. The writer has never been able to clearly understand why the certification requirements should vary widely perhaps on adjoining farms because an imaginary line known as state boundary line may separate the two fields of potatoes offered for inspection.

In the United States according to the Report on Seed Potato Certification for the year of 1924 tabulated by H. O. Werner, the total disease tolerance varied from 5 to 11 per cent for the first field inspection for the 21 states producing certified seed; for the second and third field inspections the percentage of total disease tolerance varied from 2 to 10 per cent and the number of field inspections from one to three. There are other differences in the certification requirements in the United States as striking as those mentioned. These wide variations should inspire those in charge to work earnestly for uniformity of certification requirements throughout the country. It may be that our ideal is too high, if it is then it should be lowered, but if our ideal is too low it should be raised. Why not be progessive in our certification requirements and look forward to raising our standards from time to time?

At the conference held at Freehold, N. J. on the 22nd and 23rd of last June and reported by W. H. Martin on pages 281-283 of the July number of this publication there was a big advancement made towards giving the inspectors better training. It was voted at this meeting to hold a similar conference next year and for each state to send samples of the various degeneration diseases to be planted in New Jersey in tuber units for study at this future conference. The writer would like to suggest that this movement be carried forward another step; i. e. each chief inspector plant a similar plot in a convenient place so that the chief inspector and his assistants would have an opportunity to study the behavior of the different diseases during the inspection season. This would

not only give the inspectors beter training but aid greatly towards uniformity in inspection and certification work.

More frequent field inspections are needed because an inspector may not be able to detect all the virus diseases at one time. When one of these diseases is masked another may be very evident, or vice versa.

The writer has seen tubers in certified seed potatoes shipped in sacks with genuine certification tags attached that were only fit for stock feed or the starch factory. Therefore, it is necessary in some cases to enforce more thorough inspection of the tubers either in the field or bin and better supervision of grading the stock before shipment. This is unquestionably a difficult undertaking and it is impossible for an inspector to see all the tubers that are put into the sack. An unscrupulous grower is likely to do the certified seed potato industry much injury.

Every member of the Potato Association of America and others interested should make use of every opportunity to help to educate the purchasers of certified as to how to detect genuine certification tags from the counterfeits.

Canada has solved the problem of the misrepresentation of certified and inspected seed by passing and enforcing the following law: *"An innspector shall have the power to inspect before export to any foreign country, or shipment within the Dominion, any plant, and to grant a certificate according to the requirements of any country demanding such, or for domestic purposes.

"All certificates so issued must bear a copy of the official seal of the plant disease or insect pest inspection service carried on under this Act.

"In the case of potatoes for which such certificates are required, **no person shall be allowed to sell or offer, advertise, expose or hold in possession for sale, for seed purposes, any potatoes in any manner or form described or designated as certified, inspected, registered, selected, or disease-free seed potatoes unless such potatoes are contained in sacks, barrels, or other containers, to each of which shall be durably attached a certificate stating that any such potatoes contained therein have been inspected in the field and after harvest by an inspector under the Destructive Insect and Pest Act and have been found sufficiently vigorous and free from serious diseases, other pests, foreign varieties, mechanical injury, or other blemishes, to warrant them being classed as Extra No. 1 Certified Seed Potatoes.**

All such certificates shall bear the grower's name or number as well as a copy of the official seal of the Plant Disease Inspection Service of the Department of Agriculture, Canada."

If the United States had the same rules and regulations as Canada has in reference to certified seed there would be no need for the

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*** From Section V of the Regulations Under the Destructive Insect and Pest Act, (P. C. 1150), effective on and after September 1, 1923.**

adoption of a copyrighted trade name to protect our certified seed potatoes against fraud.

In summing up we must continue to fight for that which is **right.** The only real and satisfactory solution to this problem is to standardize the requirements for certification of seed potatoes so that certified seed will mean the same wherever produced or sold in North America and legally protect the certified seed industry against fraud.

POTATOES IN THE RED RIVER VALLEY

C. L. Fitch

The writer has just returned from a week in the Red River Valley, where he spent Tuesday and Wednesday with the Minnesota Potato Tour, starting at Moorhead and ending at Crookston, and two days in going over with Mr. W. J. Koppen and Professor E. M. Gilleg of Moorhead, the four local seed improvement plots which the Commercial Club has put on for the benefit of the Clay county seed potato trade and improvement of local seed.

There will be a poor crop in the Red River Valley and much of the crop cannot be of good shape. I judge that with a reduced acreage of about 15% the total crop in the valley may not equal half of the recent average. The chief cause of the damage to the condition of the crop was the month of wet weather experienced during the early growing season. There is considerable blackleg and the vines are small. There has been a great deal of bug damage because in the mud the farmers could not fight this pest. The ground water level never too low has been altogether too high, and more than anything else, because the plants are almost universally injured by rhizoctonia. The better fields are sure to have enormous vines and it seems likely that only a small portion of the crop will be of good shape. A very large region depends upon the Early Ohios and the Irish Cobblers produced in this region for their seed supply and if the general crop of potatoes of the United States should be short, prices for good seed from the Red River Valley are sure to be high.

Our own development plots were on selected land and even one foot above the surrounding fields proved to be a life saver. Eighteen growers of seed potatoes have placed there samples of their crop in competition in each of the four plots, there being 36 hills from each farmer in each planting repeated four times in each of the four plots.

The Commercial Club of Moorhead contributed $200.00 to the expense of this work and out of it we are sure that much good is to come for Clay county and the Red River Valley. The lots of seed which will produce the best are sure to become known. This will help in sales and the general question of quality will be stimulated.

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Our present hope is that out of this work may grow a society of 20 or 30 seed producing members who will continue these competitive tests, dropping from their membership those farms and farmers whose seed does not on the average, come up to standard, and taking in the best growers and the best farms as they may appear. We hope that Mr. E. D. Askgaard of Moorhead, one of the best students of the potato plant in this country, may act as advisor to that cooperative organization. Mr. A. O. Christenson, president of the Farmers and Merchants State Bank, is local chairman.

POTATO MARKET OUTLOOK ENCOURAGING

(Contribution from the Fruit and Vegetable Division, Bureau of Agricultural Economics, U. S. Department of Agriculture)

Although about 4,000,000 more bushels of potatoes are now expected than appeared from the July forecast, the August report of 353,266,000 bushels still leaves estimated production far below average and still the lightest crop since 1919. Condition of the total crop declined 5 points to 79 per cent. Present indications are for about 102 bushels per acre, but weather conditions from now until final harvest may change this figure. Yield last year averaged 124 bushels. Greatest gains in estimated production during July

were made in Michigan, Wisconsin and Minnesota. Those three states show a combined increase of 9,000,000 bushels, and smaller gains are indicated for Pennsylvania, Ohio and Illinois. Conditions declined in all other important states, but New York still leads with approximately 36,000,000 bushels, and Maine is second with 32,500,000.

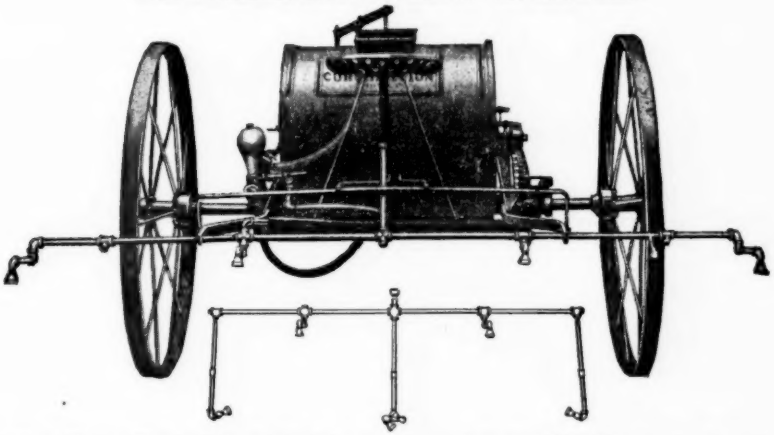
Quality of the potatoes being dug in various sections was not all that could be desired. The Kaw Valley and Orrick crops were below average, because of unfavorable weather conditions. Only about half the stock in southcentral Nebraska was meeting requirements of No. 1 grade. Early Minnesota potatoes were mostly of U. S. No. 1 size, but considerably scabby. First shipments from New Jersey contained many small potatoes, but later rains helped to increase the size of the undug tubers. Many Jersey shippers were grading their stock over 1¾ inch sceens; potatoes up to the 1⅞ inch standard were bringing a slight premium. There was the usual amount of trouble from scab, grub and wire-worm injury. Toward the end of the season for first-crop shipments on the Eastern Shore of Virgina, considerabe damage was caused by tuber moth, according to reports from Federal inspectors in that territory. Latest advices indicate that the Aroostook County crop, in Maine, is in excellent condition. Use of certified seed has been increasing in various states, and now the growers around Alexandria, La., are talking of planting certified stock almost exclusively next season. That deal has nearly "played out" during recent years.

Supplies Relatively Light

With weekly shipments of potatoes in July averaging about 1,500 cars less than during the same period last season, market supplies have been rather light. But, as movement from late or main-crop states increases, the seasonal difference becomes less noticeable. During the first week of August, output was only 600 cars less than the corresponding movement a year ago. Shipments were rapidly gaining in New Jersey, Long Island, Michigan, Minnesota, Colorado and Idaho, while the season was waning in Virginia, Missouri and Kansas, with relatively light movement from Maryland and Nebraska. Total output of 41 states that week was 3,115 cars, including first shipments of the season from Maine, Pennsylvania and Wisconsin. New Jersey took first place, with 750 cars, and Minnesota ranked second.

Markets seemed to be somewhat unsettled. There were signs of a weaker tendency, after the high prices of the past month. The cash-track prices of leading varieties at shipping points in Kansas, Nebraska, western Colorado and Idaho were remarkably similar, all falling within a range of $2.15-$2.30, sacked per 100 pounds. F. o. b. sales of Early Ohios were being made in the Sandland district of Minnesota at $2.25-$2.50, with Cobblers in northern and central New Jersey bringing $3.15-$3.35. A year ago, the New Jersey price was about $1.00.

OK CHAMPION—4-ROW SPRAYER



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The Sprayer comes regularly equipped with pipe arranged for four rows, one nozzle to the row. The same pipe may be arranged to spray two rows, 2 or 3 nozzles to the row, as shown above.

We invite your inquiry so that we can explain this Sprayer more fully. Address:

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333 Sheffield Ave., Hammond, Indiana

Dealers in eastern cities had to shade prices a bit, but some advances were reported in the Middle West during early August. Maryland and Virginia Cobblers were jobbing at $6.00-$6.75 per barrel, with top of $7.25 for Virginia stock in Atlanta. Sales of sacked New Jersey Cobblers slumped to low mark of $3.15-$3.35 per 100 pounds on the New York market, and fairly well graded Giants brought $2.65-$2.85. Field-run stock from Long Island sold in the metropolis at $5.75-$6.00 per barrel, or $3.35-$3.65 per 100 pounds sacked. Rapid fluctuations occurred on Minnesota Early Ohios in the Chicago carlot market, closing quotations about August 8 being $2.35-$2.50, with Kansas and Missouri Cobblers ranging 40 cents above Minnesota stock; best Nebraska potatoes touching $3.20; Colorado and Utah stock top of $3.50, and Idaho Rurals $3.75 in Chicago. Texas markets reported iced shipments of White Rose from California at $3.85-$4.00. Michigan Russet Rurals declined to $3.15-$3.35 in Detroit, and Kentucky potatoes sold at $3.65 in Cleveland and Cincinnati.

Long Island a Unique Potato Section

Growers on Long Island, New York, are in a specially favorable position. They are close to the great metropolitan consuming

centers and their crop is ready for market before late potatoes offer much competition. Although acreage is said to be about the same as in 1924, yields are expected to be heavier and a total of 7,000 cars may be shipped this season. Yields thus far have been averaging more than 200 bushels per acre. Plantings of Irish Cobblers were increased; it is these potatoes which were being shipped rapidly during early August, and at good prices. Digging of the Green Mountain crop on Long Island was expected to start actively about August 15. Last year, New York City received around 4,200 cars, or three-fourths of all the potatoes shipped from the Island. Large motor trucks, holding nearly half-a-carload each, haul much of this produce to market, in addition to the rail shipments. At the height of the movement, as many as 30 truckloads per day are forwarded, and the season total shipped in this manner may be 600 or 700 carloads.

The Long Island potato territory probably is unique in that there are no cooperative associations of growers, because there seems to be no need of them. Most of the farmers are independent, and can afford to be on account of their peculiar location. Generally, they receive comparatively high prices for their stock. Their proximity to large markets, the low freight rates, and the season of the year during which they ship the bulk of their potatoes, are factors contributing to their general prosperity. There are no advance sales worth mentioning—very little, if any, contracting for future delivery. Attempts were made early in June to contract for large quantities of potatoes at $1.00 per bushel, but the growers refused to consider these offers, and the present market seems to justify their decision.

In conclusion, it may be said that the Federal-State shipping-point inspection service on potatoes has been used extensively this season. Growers in the Elizabeth City section of North Carolina claim that a premium of 50 cents per barrel was obtained on stock which was graded carefully enough to pass inspection, and most of the Elizabeth City shipments were inspected this year. About 900 cars were certified under the cooperative inspection service in eastern Oklahoma—a new departure for that region. About a dozen other states, chiefly in the south, have been using this service, and it is regularly employed in many of the northern or main-crop sections. Many thousands of cars are examined in the course of a year by the Food Products Inspectors of the Bureau of Agricultural Economics.

POTATO MEETINGS AND TOURS

KANSAS.—The Fifth Annual Kansas Potato Show will be at Topeka, Kansas, on the 4th, 5th, and 6th, of November.

NEW YORK.—The Northern New York Potato Tour, "In the Adirondacks", was held on July 21, 22 and 23. The growers of

certified seed potatoes of Clinton, Essex and Franklin counties cooperated in making this tour a real opportunity to study the methods of developing and maintaining fields of high-yielding and practically disease free seed potatoes. The potato sections of the above counties are located on the small plateaux and plains in the Adirondack Mountains and foothills where the climatic conditions are favorable for maintaining the vigor and vitality of Green Mountain seed potatoes. Due to the natural barriers in the Adirondack section isolation of seed plots and fields are easy which aids in controlling the virus diseases.

Several tuber unit demonstrations which are being conducted under the supervision of the Plant Breeding Department were visited. These plots demonstrated that progress is being made in eliminating diseases. Prof. J. R. Livermore of the Plant Breeding Department, New York State College of Agriculture discussed the value of this work.

At the seed source demonstrations Dr. M. F. Barrus lectured on the development of disease-free seed potatoes.

VERMONT.—The summer meeting of the Vermont Seed Potato Growers Association was held at Randolph on August seventh.

Potato field day of the Dimock Orchard Seed Potato Corporation was held at East Corinth on the eighth of August.

WISCONSIN.—The 1925 potato tour was held during the week of August 10. One of the chief subjects of interest on this tour was the mosaic control work located in the counties through which the tour was conducted.

POTATO NOTES

Colorado.—The potato crop outlook in San Luis Valley, Western Slope, Montrose, Delta, Carbondale, Roaring Fork, Crystal River, and Eagle Valley Districts is very good, although the acreage this year is less than last.**—Lou D. Sweet, July 28, 1925.**

Connecticut.—Potatoes, both Irish Cobblers and Green Mountains, have done very well in Connecticut during July. Frequent showers and sufficient sunlight have evidently overcome the handicap of the hot, dry weather in June. However, the weather conditions, although favorable for vine and tuber growth during the past few weeks, have also been responsible for a very threatening attitude of late blight. Seemingly this trouble is with us earlier than usual this year. Fields of Irish Cobblers were seen which were entirely dead from blight on July 16. At this writing, (July 30), practically all unsprayed Irish Cobblers are dead and even well sprayed fields are going rapidly.

The Green Mountains are threatened with a much greater loss, however, for with this variety, the tubers are not half grown in

most fields. During the past week blight has developed alarmingly in all fields observed, including some in each of four counties. The conditions, of course, are worse in the unsprayed fields, but growers who spray are having difficulty in keeping the vines covered with Bordeau mixture due to the rank growth induced by the wet weather. Enough diseased leaves are present to insure very rapid spread if the weather of the past two weeks continues. Ten days without rain would be a great boon to the potato growers. Otherwise, the late or main crop may be cut 30 to 50 per cent.

Not very many Spaulding Rose or Rural varieties are grown in Connecticut. Of these, the former seems to be more and the latter less susceptible to blight than Green Mountains, when all are grown under exactly the same conditions. This is evidently due to the differences in time of maturing.—**B. A. Brown, Agronomist, Storrs, Connecticut, July 30.**

Maine.—The potato situation in Aroostook County as observed during July 19 to 29 seems to justify the belief that there will be a satisfactory crop. Growers and dealers are optimistic both as to yield and to price and are looking forward to a profitable season.

Those best qualified to judge the condition of the crop estimate it at from 80 to 90 per cent of normal. In our opinion this estimate is too low. The reason advanced for such opinion is that those making the estimate were in all probability biased by the unusually large crop of 1924. It would seem to the writer that the condition of the crop during the period observed was never more promising. The potato plants at that time were blooming profusely and generally speaking were making a vigorous growth. It is true of course that a goodly number of fields show misses. These misses are the result of many factors such as poor seed, poor storage, poor handling of seed after cut, poor mechanical mixing of the fertilizer in the drill row, lack of sufficient soil moisture, etc. It is believed that, taking one year with another, better results would be secured by the average grower if a large proportion of the commercial fertilizers were broadcasted on the potato field and disked in prior to planting the crop; the balance being applied with the planter when planting the seed.

While there has been a marked shrinkage in the total potato acreage entered for certification this season it is still sufficiently large (over 18,000 acres) to keep the inspection force extremely busy during the rather limited period in which field inspections can be satisfactorily made.

Only one report of late blight had been received prior to July 29. As a rule the growers are spraying their plants quite thoroughly. Most of them are using liquid instead of dust sprays. No serious loss is anticipated from late blight unless weather conditions should become especially favorable to a rapid spread of the disease.—**W. Stuart.**

Michigan.—The condition of the potato crop in Michigan at present indicates that the yield will be at least 25 per cent less than last year.

Drought conditions affected the stand in the Greenville district. A sharp frost on June 28 hurt the early planted in the northern part of the state inland from the influence of the Great Lakes. Hot, dry weather has shortened the early crop but where thorough and frequent sprayings with Bordeau mixture and arsenicals has been practiced a good yield will be secured. Flea beetles have been operative since late in May. The leaf hopper appeared in numbers about July 10th and many of the early planted potatoes that have not been sprayed have been riddled with the Flea beetles and burned up by the leaf hopper.

If it continues dry and hot during the month of August the unsprayed late crop is apt to be seriously damaged with leaf hoppers. Last year on account of the wet weather during June and July the leaf hopper caused little trouble.

On a one-day potato tour July 18 in Wayne County, in which Detroit is located, the Certified Irish Cobblers showed a vigor of growth, uniformity of plants and freedom from disease that was a striking example compared with local home grown seed. A very small amount of leaf-roll, mosaic, and spindle-tuber was found in the certified seed.

The price of local home grown Irish Cobbler on the Farmers' market in Detroit is from $2.00 to $2.35 per bushel. With prospects of a good price for this year's crop there will probably be an increase in the acreage of early potatoes in the Detroit area another year. Active harvesting will begin about August 1st.—**J. W. Weston, July 28.**

New Brunswick.—The moisture conditions during July have been favorable for a luxuriant vine growth which is especially true of the Irish Cobbler variety.

Many growers planted more thickly this season than ever before with the object of lessening the size of the tubers. In one instance there were eleven barrels of seed planted per acre.—**O. C. Hicks, Secretary-Treasurer, N. B. Seed Potato Growers Association, Fredericton, N. B., August 3rd.**

NEW YORK POTATOES DEVELOPING FAST

During the past two weeks the writer has visited most of the important up-state potato growing counties. Everywhere Irish Cobblers and other early varieties are looking good. April plantings are about ready to dig and are selling from $1.50 a bushel at the farm to $2.50 a bushel in the cities.

The late varieties made a very poor start in most places but have been doing well lately. In central and western New York the Colorado beetle has ben more troublesome than usual. To date

the flea beetle has done very little damage. Aphis and leaf hoppers are very general in limited numbers throughout western New York potato fields but with the exception of some Irish Cobbler fields they have not caused much injury yet. Occasional signs of late blight were found in widely separated sections of southern and western New York.—**J. M. Hurley, Syracuse, N. Y., August 4.**

Long Island, N. Y.—Due to hot weather, aphids and light rain fall the Long Island potato crop will not be over 75 per cent of the normal production.—**H. R. Talmage, August 1.**

SEED POTATO CERTIFICATION NOTES

INSPECTION STANDARDS FOR CERTIFIED SEED 1925

These rules and standards apply for the whole Dominion of Canada.

FIELD		TUBER	
Blackleg	3%	Wet Rot (bacterial)	2%
Leaf Roll (Curly Dwarf, etc.)	2%	Late Blight and Dry Rot	3%
Mosaic	2%	Common Scab and Rhizoctonia—severe	5%
Wilts	3%	Powdery Scab	1%
Foreign	1%	Necrosis, Wilts and Internal Discoloration, other than due to variety	5%
Providing that in no case shall a total of more than 6% be allowed.		Providing that in no case shall a total of more than 10% be allowed.	

Not more than 2% of the tubers shall be foreign, badly off type or damaged by sunburn, cuts, cracks, bruises, insects, etc.

No frost injury shall be allowed.

Not more than 5% by weight of the tubers shall be below three ounces or above twelve ounces.

British Columbia.—The prospects for a large potato crop in British Columbia are not bright, in spite of an increased acreage in most districts, on account of the large amount of disease appearing in the crop. The chief disease is Mosaic and it is worse this year than any of the five years in which the writer has resided in the Province. Crops planted with ordinary seed are suffering worse from the disease although certified seed fields are containing more Mosaic than usual. It is difficult to give an explanation for the increase in Mosaic this year but it appears worse in certain

varieties and in certain districts. The writer is of the opinion that to obtain the best certified seed the grower must start to rogue his crop for Mosaic when the plants are five inches and continue this practice regularly throughout the growing season. Growers who are not prepared to do this should have their crops rejected without any hesitation whatever on the part of the inspector.

In order to check up on this phase of the work the inspector should start out to make the first field inspection when the plants are quite small and not wait until blossom time as is frequently done.

The writer is also of the opinion that more investigational work with respect to potato diseases and Mosaic in particular needs to be done all over the country. The certification work has now got to the stage where many problems present themselves for solution. Provincial and State investigational plots are urgently needed.—**C. Tice, Chief Agronomist, July 31.**

CERTIFIED POTATO TESTS

Maryland.—A new policy adopted recently by the Seed Certification Board makes it obligatory upon the grower of potato seed stock for certification to furnish the Board with a sample of the seed stock for testing. Comparative tests are being carried on in Worcester and Garrett Counties, and at College Park.—**Fred W. Geise, Professor of Truck Crops, Maryland University. Aug. 1.**

New Brunswick.—The acreage for which applications for inspection for certified seed were made is much less than last year, being only 3380 acres—2000 acres of the Green Mountain variety and 1380 acres of Irish Cobblers.—**O. C. Hicks, Secretary-Treasurer N. B. Seed Potato Growers' Association, Fredericton, N. B. Aug. 3.**

New York.—The symptoms of potato diseases are very noticeable this season and there is a marked contrast between fields planted with healthy seed as compared with fields showing disease. Both seed potato growers and inspectors claim this is a good season to rogue their fields and remove all of the diseased units from their seed plots. It is likely that as a result of the higher certification standard in effect this season coupled with the favorable conditions for making inspections that considerably smaller acreage will be certified in this state this season.—**J. M. Hurley, Syracuse, N. Y., Aug. 4.**

DECLARES 20 PER CENT DIVIDEND

J. M. Hurley, Sec.-Treas.

On July 10 the New York Co-operative Seed Potato Association rebated to its members 20% of the sales fee deducted from the

77,602 bushels of certified seed sold during the previous six months period.

Ontario.—The acreage entered for Certification this year in Ontario is slightly above that of 1924, a few new growers have applied for inspection but practically all the growers who had their seed certified last year have entered their fields again this year. This is encouraging in view of the sad experience many of them had with the fall in prices for seed this spring but they realize however that the certification work helps them considerably in maintaining good yields for if their plots do not pass they know it is time to change their own seed.

More interest is taken in the roguing for diseases than formerly, growers used to be well satisfied if their fields just passed the certification requirements now, however, they are trying for something better than that, a good field report means a ready sale in many cases.

It is becoming more evident each year that some districts, which are considered good early potato growing districts, are unsuited to the growing of potatoes for seed purposes. In the southern and south-western parts of the Province, notably Essex and Kent counties, the best of Northern grown seed will often break down badly to leaf-roll the second year, even when rogued the first year and most of the growers there are satisfied that it pays them better to import certified seed each year from northern Ontario and New Brunswick in preference to attempting to grow their own. Some seed grown locally for one year on recovered marsh land, from northern certified, gave good yields on the higher lands but as a rule the certified from northern Ontario and New Brunswick will outyield the local grown nearly one hundred per cent.

Digging of the early crop commenced in the Leamington and Blenheim districts on July 10th, several cars loaded at Windsor during the week of the 13th, prices ranged from $2.50 per 90 lbs. at the start to $2.25 later in the week but recovered to $2.50 again at the end of the week. Many fields are already cleaned up and prospects are good for profitable prices to the growers during the mid-season. There has been a long dry spell of weather in the southern districts. Good rains are helping things along now, however, and will improve the crops considerably. Other parts of Ontario have had an abundance of rain and excellent weather for potatoes, except for a few places in northern Ontario where there was too much rain, and some damage has been reported of fields drowned out.

The necessity of good storage for certified seed is well illustrated in some cases that came to my notice this week, in one case a grower stored half of his seed from a certified field in his own cellar (which is well aired and without a furnace) and the other half in

his father's house-cellar where storage conditions are not so good. The stand of plants from the seed from his own cellar is excellent and will certify again this year but the stand from the seed from the other cellar is very poor and will be rejected for seed purposes as lacking in vigor, one can easily see "to the plant", where one lot finishes and the other lot starts.—**J. Tucker, District Inspector, July 27.**

Vermont.—About eight hundred and fifty acres of potatoes were entered for certification this season in Vermont. This represents an increase of more than a hundred acres over last year's total figure. Approximately four-fifths of the acreage was within the Green Mountain group; the remainder was planted to Irish Cobblers except for one or two very small fields of Rurals. The acreage is divided among one hundred and seventy growers scattered about twelve counties of the state. Orange, Washington, Windsor and Franklin counties, however, are still far in advance in the amount of acreage entered. Notable increases during the past two years have been made in Chittenden and Caledonia counties.

Notwithstanding the fact that weather conditions appear to have been right in Vermont to bring out mosaic indications and that the tolerance limit on degeneration diseases was cut to three per cent for first inspection, a higher percentage of fields than usual have so far passed first inspection. This may be logically attributed to the general use of carefully selected stock from the best strains. Practically all the Green Mountains have been planted from the Fitch, Calais, Dimock Orchards, English, Pride of Vermont or H. Fish strains; most of the Cobblers are of P. E. I. origin with three or four years' history in Vermont or from the old Greensboro strain, which seems to have gained much popularity.

Stands are, on the whole, very good; though some fields have many missing hills which may be due in part at least to extreme heat at time of planting. Traces of late blight were noted on July 22nd, indicating danger where thorough spraying is not carried out. —**Harold L. Bailey, Vt. Dept. of Agri. Aug. 1.**

Vermont.—Disease symptoms in the Green Mountain State are all topsy-turvy this season of 1925. A plant three inches high may show marked symptoms of mosaic while leaf-roll will not develop for six weeks after the appearance of the plants above ground.

In other years, roguing for leaf-roll has been finished before mosaic symptoms had begun to appear, but then the weather has been topsy-turvy—instead of gasping for a drink, the plants have been wet down almost every twenty-four hours since they had the hardihood to show themselves.—**Julian A. Dimock, Aug. 3.**

NOTES ON RECENT LITERATURE

BROWN, B. A. AND WM. L. SLATE, JR.—Miscellaneous experiments with potatoes.—*Conn. (Storrs) Agricultural Experiment Station Bulletin, 126, January, 1925.*

This bulletin deals with the following subjects. Comparative effect of mosaic and leaf roll; effect of spindle tuber on yield; effect of spraying on yield; summary of source of seed tests, 1920-1924 and Peruvian guana compared with tankage. The summary given below is a duplication of the one in the bulletin.

Summary

1. Plants of the same strain of Green Mountain potatoes averaged 0.57 pounds per hill when infected with mosaic and 0.33 pounds when infected with leaf-roll.
2. The yields of substrains of a strain of Irish Cobbler potatoes decreased from one hundred ninety-six bushels per acre when twenty-five per cent of the plants were infected with spindle-tuber to sixty-six bushels when 100 per cent of the plants were infected.
3. Spraying Green Mountain potatoes with Bordeaux eight times through July and August increased the yields about fifty per cent in 1921 and 1922, but gave no increase in 1923.
4. Spraying Irish Cobbler potatoes with Bordeaux until the vines were nearly dead, doubled the yield in 1921, but gave no increase in 1923.
5. Certified strains of Green Mountain potatoes have a five year average of sixty-three bushels per acre and ten per cent U. S. Grade No. 1 more than uncertified strains from the same regions.
6. Certified strains of Irish Cobbler potatoes have a four year average of nineteen bushels per acre and ten per cent more U. S. Grade No. 1 than uncertified strains from the same regions.
7. Certified strains of Russet Rural potatoes yielded thirty-nine bushels per acre and one per cent U. S. Grade No. 1 more than uncertified strains in a one year test.
8. Certified strains of Green Mountain potatoes had 23.8 per cent less plants infected with degenerative diseases than uncertified strains. The difference in this respect was only 7.0 per cent with Irish Cobblers.
9. Certified Green Mountain and Irish Cobbler seed potatoes from Vermont and New York have averaged yields above those from Maine and Canada.
10. The histories of the strains of potatoes in the source of seed tests at this station show that Vermont and New York growers have been able to hold their strains much longer than the Maine growers.
11. The use of Peruvian Guano to replace animal tankage in fertilizer for potatoes decreased the total yields sixty-four bushels per acre (17 per cent) in a one year test.—**Walter M. Peacock.**

GILBERT, ALFRED H.—"Giant Hill" potatoes a dangerous source of seed. A new phase of spindle-tuber.—*Vt. Agri. Exp. Sta. Bul. 245, May, 1925.*

The author emphasizes that potato growers are quite likely to save and to use as seed the tubers from exceptionally large, thrifty looking plants and that it is a dangerous practice.

The vines of the giant hill plants are coarser, later in blooming and remain green longer than the ordinary ones. The mature vines are taller and more spreading with stems conspicuously margined and rough. The leaves are upright, often somwhat rolled

or rugose or wavy margined. The tubers are generally elongated, pointed at one or both ends, frequently constricted at some point on the axis, numerous eyes which are either flush with the surface or protuberant and sometimes shortened and pointed at one end giving them a triangular outline.

Spindle-tuber, another degeneration disease, has been recently recognized as a limiting factor in potato growing. The symptoms have been described by Schultz and Folsom as follows: "The spindling-tuber disease is characterized always by spindliness and uprightness and often by a darker green color and slight rugosity. The tubers are abnormally spindling, spindle-shaped, cylindrical and supplied with conspicuous eyes."

The control measures recommended for spindle-tuber and giant hill are: plant disease-free potatoes, isolate the seed field from other potato field, and practice thorough roguing throughout the growing season.

The degeneration diseases include mosaic in its various forms, leaf-roll, streak, yellow dwarf, giant hill and spindle-tuber. These are easily recognized in their advanced stages, but in the early stages they are difficult to detect and often impossible.—**Walter M. Peacock.**

McDaniel, E. I.—Potato-beetle destroyer.—*The Fruit Belt, 23: 7, July, 1925.*

The author states that the original home of the Colorado potato-beetle was in the eastern foothills of the Rocky Mountains, where it lived on native weeds and now it occurs throughout the country wherever potatoes are grown. "The potato-beetle destroyer" (a stink-bug) is one of its most important natural enemies.

There are two distinct forms of potato-beetle destroyer, one black and tan and the other black and orange. They came from the southwestern United States and have progressed steadily eastward. The author states that the potato-beetle destroyer has been known for the last twenty years in Michigan and at present is distributed throughout the state and is efficiently working to the advantage of the potato growers.

The potato-beetle destroyer begins its work early in the spring and acts as an efficient natural means of controlling the Colorado potato beetle. It places its small dark eggs in groups on the undersides of the leaves along side of the gold yellow eggs of the Colorado potato beetle. "The young bugs, when they first hatch are brilliant red with dark heads, their appearance changing with each successive molt. The young when first hatched feed only on the eggs of insects, those of the Colorado potato beetle being preferred; later they attack the immature stages of potao beetles and other insects.

The potato-beetle destroyer has sucking mouth parts and consequently is not destroyed by arsenical poisons. It subsists solely on other insects.—**Walter M. Peacock.**

McINTOSH, T. P.—Potato tubers and sprouts: Their value in identifyng varieties.—*Jour. Min. Agr. (Gt. Brit.), 32 (1925), No. 3, pp. 250-261, fig. 1.*

The characters of the tuber which persist after maturity and are considered useful in determining the variety include shape, color and condition of skin, position and depth of eyes, color and consistency of the flesh, type of second growth, and microscopic characters. The tubers of some potato varieties common in Great Britain are classified as to shape and as to color of tuber and flesh. **—H. M. Steece.**

MARBLE, L. M. AND R. D. ANTHONY.—Construction and management of bank storage cellar.—*Penn. Agrl, Exp. Sta. Bul. 191., Jan. 1925.*

Growers who are interested in the storage of potatoes on the farm, and also at shipping centers, should obtain copies of two bulletins just issued by The Pennsylvania State College, State College, Pennsylvania. Bulletin No. 191, entitled Construction and Management of Bank Storage Cellars, gives working drawings and estimates of costs for a number of different sized storage cellars, ranging from 1,000 to 10,000 bushels in capacity. A supplement to Bulletin No. 191 just issued gives the same information for a 4500 bushel capacity Above Ground Air Cooled Storage. The storages described in these bulletins are suitable for the storage of potatoes in crates and bags.

A comparative study of the two types of storage, the above ground and the cellar storages, is to be made this year at The Marble Laboratory Inc., Canton, Penna.**—L. M. Marble.**

MULLER, H. C., E. MOLZ, AND K. MULLER.—The influence of the type of winter storage of seed tubers on the condition and yield of potatoes (trans. title).—*Deut. Landw. Presse, 51 (1924), No. 11, pp. 113, 114.*

Seed potatoes were stored during the winter in moderately warm or heated rooms, with restricted respiration of carbonic acid gas and with free access to air, in sacks and in metallic containers, were given a warm winter storage with a short cool period, and the usual pit storage, and were buried 25 cm. deep in the soil in the open.

The best stands and the highest yields were obtained from the seed which had been stored in the usual outdoor pits or stratified in the soil. Warm winter storage promoted reduction of yield and degeneration. A short cold period seems to reduce these adverse effects. Accumulation of respired carbonic acid seemed to be very prejudicial to the health and yield of tubers. Normally stored tubers planted April 19, May 1, and May 17 in field tests produced, respectively, 51.2, 49.3, and 36.3 kg. of tubers, and the potatoes stored in a heated laboratory 45.1, 38.7, and 32.3 kg. With pit storage in hard soil the author recommends ventilation through the bottom of the pile. Connection with the outer air through the straw

layers makes the elimination of the respired CO_2 possible.—**H. M. Steece.**

SALAMAN, R. N.—The Inheritance of Cropping in the Potato. —*(In Imperial Botanical Conference, London, 1924, Report of Proceedings. Cambridge: Univ. Press, 1925, pp. 40-48, fig. 7).*

Investigation of the inheritance of (cropping) yield in the potato involved some 25,000 seedling potatoes contained in over 400 families. Besides weighing the crops, the relationships between the mass of tuber and the mass or area of the foliage were estimated visually and placed into classes ranging from "very good crop," in which the proportion of the tuber mass to the above ground stem was very high, down to "zero croppers" where there was no tuber formation, or at most a few thickened bulbous swellings on the stolon.

The factors which may control yields did not seem to be sex-linked. "Whilst the relation between actual crop weights and the vigor of the plants producing them is a close one, there is no definite relation between the cropping curve of a family and the vigor of the plants which give rise to it. A high curve may be associated with low vigor and a low one with high vigor, or **vice versa.** On the other hand, zero croppers are very frequently accompanied by the highest vigor. A considerable number of brother-sister matings have been made in highly inbred families, with a result that the vigor may be considerably restored by such mating, whilst the crop is not necessarily affected. Further examination of the material is required before any more definite statement can be made. It would appear, however, that not only is the genetic basis of cropping independent of vigor, but that there is probably no relationship between the genetic factors for cropping and such others as may conduce towards the production of vigor. On the other hand, the total quantity of tuber material formed by any given plant, is largely determined by the vigor of that plant, and that that vigor may well be dependent on the heterosis exhibited by the individual as determined by such factors as those for color and shape, would appear to be highly probable from the analysis of the material so far undertaken."—**H. M. Steece.**

SCHAEPER, E.—Studies on some stalk characters of the potato (trans. title).—*Jour. Landw., 72 (1924), No. 3, pp. 163-195, fig. 1.*

Characters of the aerial portion of the potato plant were studied in 994 varieties at Gottingen, Germany, in efforts to obtain accurate descriptions. Typical descriptions of Blucher, Deodara, Magdeburger Blaue, and Model are included.

Among the significant correlations determined were those between stalk height and stem length $r = +0.800 \pm 0.040$, stalk height and stem inclination $+0.520 \pm 0.086$, stem length and stem frequency $+0.582 \pm 0.073$, stem length and leaf length $+0.409 \pm 0.104$, stem length and stem strength

+ 0.481 + or — 0.086, leaf length and leaf frequency + 0.403 + or — 0.102, leaf length and feather (major) leaflet size + 0.753 + or — 0.054, leaf length and feather leaflet interval + 0.823 + or — 0.040, leaf length and feather leaflet frequency + 0.471 + or — 0.097, feather leaflet size and feather leaflet interval + 0.474 + or — 0.096, feather leaflet size and stem strength + 0.563 + or — 0.073, stalk length and tuber weight + 0.427 + or — 0.093, stalk length and tuber frequency + 0.606 + or — 0.072, stalk number and tuber weight + 0.462 + or — 0.088, stalk number and tuber frequency + 0.487 + or — 0.095, feather leaflet size and tuber weight + 0.396 + or — 0.094, feather leaflet size and tuber frequency + 0.500 + or — 0.085, vigor and stem length + 0.574 + or — 0.076, vigor and feather leaflet size + 0.489 + or — 0.085, vigor and tuber number + 0.411 + or — 0.098, and starch content and vegetation period **r** = + 0.478 + or — 0.086.—**H. M. Steece.**

SNELL, K.—Potato varieties.—*(Arb. Forschungsinst. Kartoffelbau, No. 5, 3. ed., rev. and enl. (1925), pp. 138, pls. 2, figs. 15).*

Earlier classifications of the potato are reviewed and listed, and an extended discussion is given regarding the use and the relations in group classification and varietal descriptions of the tuber characters—the form, the color of skin and flesh, the character of the eyes, culinary qualities, and the sprout, and the plant characters—the stem, the leaf, flowering ability, the variation in flower color, the relation between tuber color and flower and stem colors, the relation between sprout color and flower color, the seed balls, and maturity. The principal types of German varieties are grouped as follows: Early maturity, Nieren and Kaiserkronen; medium early maturity, Ella, Primal, and miscellaneous varieties having (a) red-violet or rose flowers, (b) white flowers or, (c) blue flowers; medium late maturity, industry, Up-to-date, Imperator, and Jubel, and miscellaneous sorts with white or blue flowers; and late varieties, (a) with stems and leaf nerves tinged with green or light reddish brown, Silesia, Werner, Beseler, and Belladona, (b) with stems and leaf nerves tinged red brown, Narrow Leaved Wohltmann, and Broad Leaved Wohltmann. Determinative keys are based on tuber characters. The outstanding characteristics and varieties pertaining to these groups are given, with descriptions of 248 German varieties, 33 Dutch and 24 Scotch varieties, and 12 groups of American varieties (after Stuart).—**H. M. Steece.**

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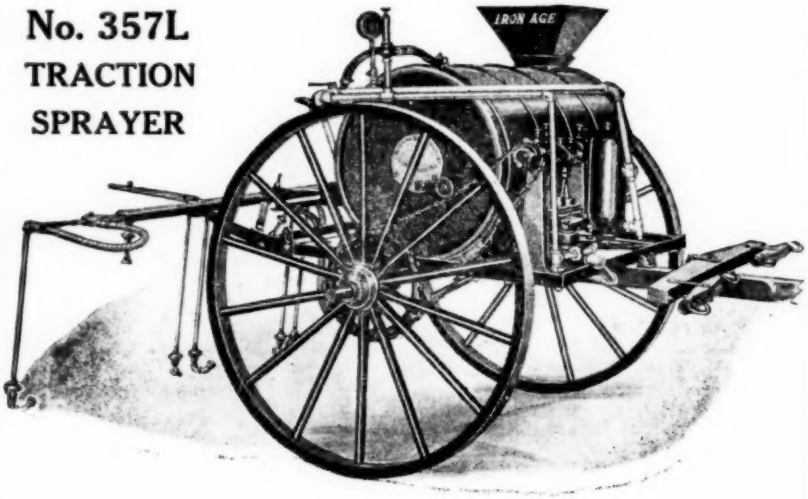

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